CLAIMS

1. Planar direct drive with

• a passive unit (1), which comprises a planar running surface (2) with magnetic flux regions;

• an active unit (3) with coil systems for generating a variable magnetic flux;

• a bearing unit, which allows frictionless two-dimensional relative motion of the active and passive units by maintaining a bearing gap (4);

• a position measuring system that comprises a measurement standard and a measuring sensor that scans the measurement standard and supplies a position signal;

characterized by the fact that

• the positioning system comprises a moving component (7) and a quasi-stationary component (8), one of which is formed by the measurement standard, while the other is formed by the measuring sensor, such that both components are arranged outside the bearing gap (4) and some distance from the running surface (2);

• the quasi-stationary component (8) is arranged at a predetermined fixed point and essentially parallel to but separated from the running surface (2);

• the moving component (7) is mounted on the active unit (3) in such a way that when it reaches the quasi-stationary component (8), it comes into measuring contact with it; and

• the position control of the active unit (3) is controlled or regulated by evaluation of the position signal supplied by the measuring sensor as long as the two components (7, 8) of the position measuring system are in a state of measuring contact.

2. Planar direct drive in accordance with Claim 1, characterized by the fact that the

quasi-stationary component (8) is arranged outside of the range of travel required by the coil systems of the active unit (3) and is vertically displaced from the running surface (2).

3. Planar direct drive in accordance with Claim 1 or Claim 2, characterized by the fact that the quasi-stationary component (8) is mounted on frame members and has a permanently fixed position relative to the passive unit (1).

4. Planar direct drive in accordance with Claim 1 or Claim 2, characterized by the fact that the quasi-stationary component (8) is mounted on a second active unit (10), which can move relative to the passive unit (1) and relative to the first active unit (3) and can be moved to the predetermined fixed points.

5. Planar direct drive in accordance with Claim 1 or Claim 2, characterized by the fact that the quasi-stationary component (8) is integrated in a fixed module (20), whose position in the plane of the passive unit (1) is fixed by at least one mechanical securing device (21, 23) mounted on the passive unit (1), and that, in addition, at least one holding magnet (24) is integrated in the fixed module (20) and holds the fixed module on the running surface (2) of the passive unit (20).

6. Planar direct drive in accordance with Claim 5, characterized by the fact that the mechanical securing device comprises a stop bar (23), which is located at the edge of the passive unit (1) and is rigidly mounted on the frame, and several mounting pins (21) that engage the stop bar (23) and the fixed module (20), and that the holding magnet (24) comprises one or more electromagnets.

7. Planar direct drive in accordance with any of Claims 1 to 6, characterized by the fact that several quasi-stationary components (8) are arranged at several fixed points that are separated from one another.

8. Planar direct drive in accordance with Claim 7, characterized by the fact that the fixed points are formed by several work modules (20) that are mounted on the passive unit (1).

9. Planar direct drive in accordance with any of Claims 1 to 8, characterized by the fact that it comprises several active units (3, 10) that can move on the common passive unit, each of which comprises a moving component (7) and/or a quasi-stationary component (8).

10. Planar direct drive in accordance with any of Claims 1 to 9, characterized by the fact that the moving component (7) is arranged in an externally accessible area with vertical displacement from the coil systems of the active unit (3).

11. Planar direct drive in accordance with Claim 10, characterized by the fact that the moving component (7) is mounted with vertical displacement from a workpiece holder (11) mounted on the active unit (3).

12. Planar direct drive in accordance with Claim 11, characterized by the fact that the moving component (7) and the workpiece holder (11) constitute a structural unit, which is replaceably connected with the active unit (3).

13. Planar direct drive in accordance with any of Claims 1 to 12, characterized by the fact that the active unit (3) has a holding frame (38), which is arranged parallel to the active running surface (36) of the active unit (3), and in which a support plate (41) is replaceably positioned, such that the moving component (7) is arranged in a plane between the coil systems of the active unit (3) and the support plate (41).

14. Planar direct drive in accordance with Claim 13, characterized by the fact that the moving component (7) is formed by a flat measurement standard (34), which is mounted on the underside of the support plate (41).

15. Planar direct drive in accordance with Claim 14, characterized by the fact that the

measurement standard (34) is a cross-grating plate, whose parallel misalignment with the active running surface (36) of the active unit (3) is less than 50 μm.

16. Planar direct drive in accordance with any of Claims 13 to 15, characterized by the fact that the holding frame (38) and the support plate (41) contain alignment devices (42, 43), which interact by forces of magnetic attraction to position the support plate (41) in a predetermined position in the holding frame (38).

17. Planar direct drive in accordance with Claim 16, characterized by the fact that the alignment devices consist of several permanent magnets (42) and opposing magnetizable aligning pins (43), which are inserted in the holding frame or in the support plate, respectively.

18. Planar direct drive in accordance with any of Claims 1 to 17, characterized by the fact that an optical or magnetoresistive sensor is used as the measuring sensor.

19. Planar direct drive in accordance with any of Claims 1 to 18, characterized by the fact that it also comprises a global measuring system, by which the movement of the active unit (3, 10) is controlled as long as the two components (7, 8) of the position measuring system are not in measuring contact.

20. Planar direct drive in accordance with any of Claims 1 to 19, characterized by the fact that the active unit (3, 10) moves in step operation as long as the two components (7, 8) of the position measuring system are not in measuring contact.

21. Planar direct drive in accordance with any of Claims 1 to 20, characterized by the fact that the bearing unit is an air bearing.